

REMARKS

ELECTION/RESTRICTIONS

The Applicant notes the Examiner's statements in Paper No.: 20040115 regarding the withdrawal of claim 1-11 and the election of claims 20, 24-26 and 30.

CLAIM OBJECTIONS

Claim 20 is objected to because of informalities, and the Examiner requests appropriate correction. Claim 20 is herein amended accordingly.

35 USC §103

Claims 20, 26 and 30 are rejected under 35 USC 103(a) as being obvious over Huang et al. (US 6,485,576) in view of Nakato et al. (US 5,545,512). The Applicant respectfully disagrees.

Claim 20 recites:

“A method of removing a spin-on compound, comprising:

spin-depositing a spin-on compound on a surface of a substrate, wherein the spin-on compound comprises silicon;

providing a solvent mixture, wherein the solvent mixture comprises an active component and at least one non-solvent component; and

spin-rinsing the spin-on compound with a solvent mixture, wherein the solvent mixture comprises the active component dissolves the spin-on compound, and the non-solvent component is inert to the spin-on compound.”

The Huang reference discloses “suitable cleaning solutions” for cleaning SOG or photoresist material from a wafer flat side, such that “a build up of the coating material and possible cracking in subsequent processing steps can be prevented.” (See Column 3, lines 21-26). In addition, Huang teaches that “suitable cleaning solutions” is a mixture of EL-100 and isopropyl alcohol. Huang also admits that other solvents may be used as long as “a desirable viscosity range and flow properties of the mixture can be achieved.” The only requirement disclosed in Huang as to solvent properties is that they are suitably mixed “such that a desirable viscosity or flow property of the mixture can be obtained to carry out the present invention method”. There is no requirement that one of the components of the solvent mixture be an “active component” which breaks down and/or dissolves the material and that the other component be a non-solvent component that is inert and/or does not break down the material.

The Nakato reference discloses methods of forming a pattern of silylated planarizing photoresists. The Examiner points to Column 5, lines 40-50 to show that Nakato contemplates utilizing propyl acetate and ethyl lactate (improperly stated as “ethyl acetate” by the Examiner in the Office Action on page 3). Nakato does contemplate utilizing ethyl lactate and propyl acetate; however Nakato does not contemplate using these solvents on spin-on compounds comprising silicon. Nakato states in that paragraph:

“A preliminary step in the methodology of the present invention is to apply a layer 52 of planarizing resist over the surface of topography 35 of the substrate 20. Planarizing resist layer 52 is preferably a conventional photoresist made up of any suitable organic polymer used in lithographic processes, well known in the art, including conventional novolacs (or functionally similar polymers), polyimides, polymethylmethacrylate (“PMMA”), polydimethylglutarimide (“PMGI”), or polyhydroxystyrene, alone or in combination with each other. It is preferred that the planarizing resist composition used in the present invention employ solvents that are relatively less evaporative than IPA for the dispersal of any sensitizers or other additives. Such solvents include ethyl lactate and propylene glycol monomethylether acetate.”

Not only does Nakato not mention the use of propyl acetate, but Nakato also does not mention using ethyl lactate as a suitable solvent for spin-on materials comprising silicon. There is absolutely no teaching, motivation or suggestion in Nakato that would lead one of ordinary skill in the art to combine with Huang to get the subject matter taught in the present application, especially in view of the paragraph cited by the Examiner from the Nakato reference. And, if there is no teaching, suggestion or motivation in either the Huang reference or the Nakato references to combine them, then the present independent claims must be found in either one of the references, and that clearly is not the case based on the above arguments.

Therefore, based on the above arguments, claim 20 is patentable over the Huang Reference in view of the Nakato reference. In addition, claims 26 and 30 are patentable over the Huang Reference in view of the Nakato reference by virtue of their dependency on independent claim 20.

Claims 24-25 are rejected under 35 USC 103(a) as being obvious over Huang et al. (US 6,485,576) and Nakato et al. (US 5,545,512) as applied to claims 20, 26 and 30 above, and further in view of Kalnitsky et al (US 5,435,888). The Applicant respectfully disagrees.

Claim 20 recites:

“A method of removing a spin-on compound, comprising:

spin-depositing a spin-on compound on a surface of a substrate, wherein the spin-on compound comprises silicon;

providing a solvent mixture, wherein the solvent mixture comprises an active component and at least one non-solvent component; and

spin-rinsing the spin-on compound with a solvent mixture, wherein the solvent mixture comprises the active component dissolves the spin-on compound, and the non-solvent component is inert to the spin-on compound.”

The Huang reference discloses “suitable cleaning solutions” for cleaning SOG or photoresist material from a wafer flat side, such that “a build up of the coating material and possible cracking in subsequent processing steps can be prevented.” (See Column 3, lines 21-26). In addition, Huang teaches that “suitable cleaning solutions” is a mixture of EL-100 and isopropyl alcohol. Huang also admits that other solvents may be used as long as “a desirable viscosity range and flow properties of the mixture can be achieved.” The only requirement disclosed in Huang as to solvent properties is that they are suitably mixed “such that a desirable viscosity or flow property of the mixture can be obtained to carry out the present invention method”. There is no requirement that one of the components of the solvent mixture be an “active component” which breaks down and/or dissolves the material and that the other component be a non-solvent component that is inert and/or does not break down the material.

The Nakato reference discloses methods of forming a pattern of silylated planarizing photoresists. The Examiner points to Column 5, lines 40-50 to show that Nakato contemplates

utilizing propyl acetate and ethyl lactate (improperly stated as “ethyl acetate” by the Examiner in the Office Action on page 3). Nakato does contemplate utilizing ethyl lactate and propyl acetate; however Nakato does not contemplate using these solvents on spin-on compounds comprising silicon. Nakato states in that paragraph:

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Not only does Nakato not mention the use of propyl acetate, but Nakato also does not mention using ethyl lactate as a suitable solvent for spin-on materials comprising silicon. There is absolutely no teaching, motivation or suggestion in Nakato that would lead one of ordinary skill in the art to combine with Huang to get the subject matter taught in the present application, especially in view of the paragraph cited by the Examiner from the Nakato reference. And, if there is no teaching, suggestion or motivation in either the Huang reference or the Nakato references to combine them, then the present independent claims must be found in either one of the references, and that clearly is not the case based on the above arguments. Since Kalnitsky does not correct the deficiency of the lack of motivation to combine Huang and Nakato and does not itself refer to the use of a solvent mixture, wherein the solvent mixture comprises an active component and at least one non-solvent component, Kalnitsky cannot be combined with either or both the Nakato and Huang references to arrive at the subject matter of the present invention.

Therefore, based on the above arguments, claim 20 is patentable over the Huang reference and the Nakato reference in view of the Kalnitsky reference. In addition, claims 24 and 35 are

patentable over the Huang Reference and the Nakato reference in view of the Kalnitsky reference by virtue of their dependency on independent claim 20.

REQUEST FOR ALLOWANCE

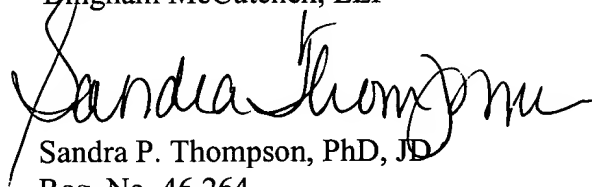
Claims 20, 24-26, 30 and 32-36 are currently pending in this application, and the Applicant respectfully requests that the Examiner reconsider all of the claims in light of the arguments presented and allow all current and pending claims.

Respectfully submitted,

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